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MX40 OPERATORS MANUAL

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DRAWMER MX40

Quad Punch Gate

SAFETY CONSIDERATIONS

CAUTION - MAINS FUSE

TO REDUCE THE RISK OF FIRE REPLACE THE MAINS FUSE ONLY WITH THE SAME TYPE, WHICH MUST BE A CLASS 3, 230 VOLT, TIME DELAY TYPE, RATED AT 63mA WHERE THE MAINS INPUT VOLTAGE SWITCH IS SET TO 230 VOLTS AC. AND 120mA WHERE THE MAINS INPUT VOLTAGE IS 115 VOLTS AC. ALL FUSES MUST COMPLY WITH BS EN 60127-2:1991, SHEET III. THE FUSE BODY SIZE IS 20mm x 5mm.

CAUTION - MAINS CABLE

DO NOT ATTEMPT TO CHANGE OR TAMPER WITH THE SUPPLIED MAINS CABLE.

CAUTION - SERVICING

DO NOT PERFORM ANY SERVICING. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

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INTRODUCTION

The MX40 is a highly flexible but compact quad Gate suitable for a wide range of professional applications including studio, live sound and audio installations. The input and output connections are electronically balanced on XLR connectors and low-distortion VCAs are used to maintain the highest possible signal quality. Although optimised for +4dBu operation, the MX40 will work equally well with systems operating at the -10dBu standard.

A Noise Gate considerably improves the sound of percussive instruments by producing fast leading edges to the signal and then shutting off after a pre-determined time. The combination of this fast rising edge, and the silence which follows the gated signal, creates a dramatic improvement to the original signal.

Designed for ease and speed of operation by having just three rotary controls per channel, complemented by push button selector switches. The sound of the MX40

starts where other budget gates finish, because the MX40 has Peak Punch: a feature which accelerates the leading edge as the gated signal opens, adding even more percussive power.

Drawmer pioneered the frequency conscious gating common to many noise gate clones now available in audio processing equipment. The MX40 has a new spin on this feature where both controls have been amalgamated into a single intuitive control, of course with a Key Listen facility. This allows fast and simple setup of frequency selective triggering where unwanted signals are prevented from triggering the gate.

Threshold and Release rotary controls select the trigger level and envelope respectively, while push buttons select: Peak Punch; Internal or External trigger source; Filter In or Out; Range amount and Key Listen. The Key Filter may also be used as a processor in its own right and applications will be discussed at the end of this manual.

A common key input buss is offered for synchronous external triggering of any or all of the four audio channels. Different options of channel linking, and internal and external keying enable various modes of Envelope and Trigger linking are discussed later.

All four channels may be operated independently or linked for multi-channel operation. When two adjacent channels are linked, the left hand channel becomes the master and the linked channel responds only to programme material arriving at the master input.

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INSTALLATION

The MX40 is designed for standard 19" rack mounting and occupies 1U of rack space. Avoid mounting the unit directly above power amplifiers or power supplies that radiate significant amounts of heat. Always connect the mains earth to the unit. Use fibre or plastic washers to prevent the front panel becoming marked by the mounting bolts.

AUDIO CONNECTIONS

Input and Output audio connections are provided via balanced XLRs at a level of +4dBu. This applies to both inputs and outputs. The wiring convention being: Pin 1 Ground; Pin 2 Hot(+); and Pin 3 Cold(-).

For use with unbalanced systems, the Cold pin 3 must be grounded at both input and output inside the XLR connectors. For connection to a patch bay, input sockets should be wired fully normalised'. The key input is an unbalanced 1/4" (TRS) jack socket. For connection to a patch bay this socket should be wired fully normalised' to prevent erratic triggering.

INTERFERENCE

If the unit is to be used where it maybe exposed to high levels of disturbance such as found close to a TV or radio transmitter, we suggest that the unit be operated using an optional wiring of the balanced configuration. The screens of the signal cables should be connected to the chassis connection on the XLR connector as opposed to connecting to pin1. The MX40 fully conforms to the EMC standards.

GROUND LOOPS

If ground loop problems are encountered, never disconnect the mains earth, but instead, try disconnecting the signal screen on one end of each of the cables connecting the outputs of the MX40 to the patchbay. If such measures are necessary, balanced operation is recommended.

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POWER CONNECTION

The MX40 unit will have been supplied with a power cable suitable for domestic power outlets in your country. For your own safety it is important that you use this cable to connect to the mains supply earth. The cable should not be tampered with or modified.

The internal fuse fitted to the power supply should never blow under normal operation. If the fuse is suspected of having blown, then a fault will have occurred and this fault condition **MUST** be inspected by a qualified service engineer. Under **NO** circumstances should this fuse be replaced by yourself. Always comply with the Safety Instructions.

If, for some reason, the unit is to be operated at a mains input voltage which is different to that as supplied, the following procedure must be carried out by a qualified technical engineer. If the voltage change process is to be repeated often, a simple switch can be fitted to simplify this procedure, this part (item # 7026) is available via your Drawmer dealer.

- 1: Disconnect the unit from the mains.
- 2: Using a number 1 size pozidrive screwdriver, remove the seven self-tapping screws that retain the top cover. (Two screws are found along each side; two along the top edge at the rear; and the upper screw on the front fascia panel).
- 3: Remove the power supply unit (PSU) module by removing the four pozidrive screws: two longer screws (10mm) holding the mains input connector; two shorter (6mm) along the bottom printed circuit board edge.

For conversion to 115Volt AC (previously set to 230Volt AC)

- 4a: De-solder and remove the single link marked K1.
Fit two links in the positions K2 and K3.
- 5a Exchange the 125mA fuse for a similar type rated at 63mA.

For conversion to 230Volt AC (previously set to 115Volt AC)

- 4b: De-solder and remove the two links marked K2 and K3.
Fit a single link in the position K1.
- 5b Exchange the 63mA fuse for a similar type rated at 125mA. In both cases:
- 6: Replace the power supply using the four screws.
- 7: Ensure the jumper connector (P2) is correctly aligned.
- 8: Replace the top cover using the seven screws.

CONTROL DESCRIPTION

The four channels of the MX40 are virtually identical and may be used completely independently or linked as pairs for stereo-channel operation. In the linked stereo

mode, only the controls of channel 1 and channel 3 are functional and serve as master controls, though all the channel bypass switches remain independent. When linked, the control signal is derived only from the programme material present at the input of the master channel.

Threshold

Sets the level below which gating starts to occur, and may be set in the range -60dB to greater than +20dB. Of course +20dB will not permit the gate to open under any signal conditions.

Display

When the gate is closed, the red LED above the Threshold control is illuminated; when the gate is open the green and amber LEDs come on and the red one goes off. When the input signal falls below the threshold, the green LED will extinguish and the amber LED will fade over the duration of the release time. This is the same 'traffic light' system used on the Drawmer DS201.

Release

The release time may be set from 10mS to 4S. Additionally some envelope hold time is built into the system which varies with the release time setting. This is to prevent chatter when processing material with inconsistent decay characteristics and is quite invisible to the user. As a general rule, the release time should be set as fast as possible while ensuring that slowly decaying sounds, or sounds which include a lot of reverberation are not significantly shortened.

Range

Range Determines how much gain reduction is applied when the gate is fully closed. The -90dB setting effectively silences the channel completely when the gate is closed while the -20dB setting will still allow an attenuated version of the channel signal to pass through. Normally we would recommend that this switch is left in the -90dB (out) position.

For signals with a high levels of background noise, the very fact of closing down to -90dB can be disconcertingly noticeable. In such cases the -20dB switch setting can achieve better results.

Bypass The Bypass position routes the input signal to the output with no processing. These switches are independent of any linking and only bypasses just their respective channel.

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Key Filter / Key Listen

In normal operation, the filter only affects the way the MX40 responds to the incoming programme material - it does not have

any direct effect on the output signal, but when Key listen is enabled, the effect of the key filter on the programme material is heard at the output.

Normally this is used to monitor the effect of the filter to assist in tuning into the specific key source sound(s). The audio signal is not routed through gate. However, the switch can be permanently enabled to produce a very effective cutting electric guitar, or similar, sound.

Trigger Freq.

The Trigger Frequency filter is variable from 50Hz to 8KHz with a width (or Q') of one octave. Outside this octave pass-band frequencies are severely attenuated. The optimum use of this control is to momentarily operate the channel in Key Listen, and tune-into the loudest part of the trigger source sound.

Ext Key

When in the Ext(ernal) Key position, the LED will be illuminated and the common external key source buss is used to control the gate action, making it possible to gate one sound according to the signal dynamics of another, independent signal. When released, this switch causes the gate to respond to the dynamics of the signal present at the channel signal input socket. If no Ext Key input is plugged into the unit, then Channel 1's signal becomes the default trigger source available to all channels selected by the Key Input.

Filter In

This switch is be used to enable the control of the key trigger filter. It is normal that this switch would be selected except where the internal (or external) control signal has a broad spectrum of audio information that the narrow pass-band of the filter would otherwise restrict trigger information.

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Linking Slave Link

The Link buttons are located between odd/even channels, and when depressed, cause the channel on the right (channel 2 or 4) to be controlled by the left-hand channel (channel 1 or 3). In linked mode, the red status LED beneath the Slave Link switch will be illuminated, and the Ext Key, Key Listen and Peak Punch LEDs of the slave channel will be extinguished. This assists to show that the only control of the slave channel that still functions is the Bypass switch.

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OPERATION

The unit should be connected in line with the signal to be processed via suitable insert points. Ensure, where possible, that the insert send and return level on your console approximately matches the operating level of the MX40. Any Gate process will fail to give adequate results if the equipment is patched into an Aux send with a separate return configuration, without additional consideration for the dry (ungated) signal present on the channel fader.

For mono use, each channel may be considered as being completely independent and set up accordingly. For use with stereo or multi-channel signals, two adjacent channels may be linked; all setting up is then done using the left hand channel's controls in any stereo linked group.

For percussive material such as drums, fast synthesised sounds or percussive guitar, the Peak Punch mode of operation will probably give the most dramatic results. However, with material having a slower attack (especially low frequency bass sounds), Peak Punch may produce transient clicks at the beginning of sounds.

With the Release control set at its mid-way position, Range set to -90dB and with suitable programme material fed into the MX40, increase the Threshold level from its anti-clockwise position until the gate starts to operate. This will be indicated by the activity of the traffic light LEDs and you should also hear the effect on the outputs signal in that pauses in the programme will now be silent. If the Threshold setting is too high, the gate will start to cut out wanted pieces of programme so you should adjust it to as low a setting as possible consistent with the effective removal of low level noise.

If the ends of sounds are obviously being truncated, then a longer release time may help. On the other hand, if unwanted noise is audible after the wanted sound has ended, a shorter release time may well be more appropriate.

There are circumstances when the programme material is corrupted not only by unwanted random noise, but by some other sound. For example, in a multi-miked drum kit setup, some hi-hat will inevitably leak into the snare mic, some snare drum into the kick drum mic and so on. Equally, when recording on location, you may experience problems due to wind or traffic noise or close-by conversation. If the unwanted noise is different in pitch to the wanted sound, it is often possible, to use the filter to 'tune' into the wanted sound while excluding as much of the unwanted sound as possible. This is done by selecting Filter In and Key Listen, then rotating the filter until the desirable part of the audio is boosted, now the Key Listen can be de-engaged and the results auditioned. Used carefully, the Filter can significantly increase the gate's immunity to false triggering.

The External Key can be selected on any channel, making it possible to open all gates using a single source. If there is no Key input inserted into the unit, Channel 1's signal becomes the default available to all channels selected by the Key Input.

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LINKED OPERATION

It is important to note that when channels are linked, the control signal is derived entirely from the left-hand channel and not from a mix of the individual channels. This means that stereo signals where one channel differs significantly from another may fare better if the channels are not linked.

On the other hand, this mode of linking is very powerful in synchronising the start

and finish of sounds, a typical application being to tighten up backing vocals. If one singer tends to finish notes on time while the others hang on too long, the correct version can be used as the master to ensure that all the others finish at the same time. An example might be to gate a low frequency tone from a bass drum signal and then add this gated tone to the drum sound to add depth.

DIFFICULT MATERIAL

As with any other gate, noise can only be removed during pauses in the wanted material. If the noise contamination is serious enough to be evident even during moderately loud programme material, then simple gating will do little to help. Indeed, the very fact that the gate produces near-perfect silence during pauses can make the noise content of the programme material seem even worse. In marginal cases, setting the Range control to -20dB rather than -90dB will adequately reduce the noise during pauses but not sufficiently to cause an unacceptably dramatic change in noise level as the gate opens and closes.

If the Gate channel is being triggered from an external source, and that external source is poorly defined or contaminated with noise, then it is possible to improve this situation by first cleaning' the external key signal with another channel of the MX40. This channel would only need to be used with low Threshold and medium Release, and perhaps a -20dB Range setting, to drastically improve the quality of the key signal. The patching of signal to do this would be simplified if the unit is connected to a patch bay, as the complicated routing (taking one output and re-inserting this to the external key jack), is not possible from the front panel control switches.

More sophisticated processors such as the Drawmer DF320 are better able to cope with excessive noise as they adaptively filter the programme so as to mask the noise during low level passages or where there is little high frequency content present to mask it.

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MX40 TECHNICAL SPECIFICATIONS

(All measurements reference +4dBu operating level)

INPUT IMPEDANCE	20K (Balanced)		
KEY INPUT IMPEDANCE	20K (Unbalanced)		
MAXIMUM INPUT LEVEL	+21dBu		
MAXIMUM KEY INPUT LEVEL	+21dBu		
OUTPUT IMPEDANCE	50 Ohm (Balanced)		
MAXIMUM OUTPUT LEVEL	+21dBu		
BANDWIDTH	<10Hz to 22KHz -1dB		
FLOOR LEVEL	-90dB, (or -20dB)		
NOISE	Wideband (worst case)	22Hz - 22KHz	
AV	-100dB	-105dB	
RMS	-104dB	-106dB	
DISTORTION	100Hz	1KHz	10KHz
Gate Open with +4dBu input	< 0.04%	< 0.04%	< 0.04%
POWER REQUIREMENTS	115Volt or 230Volt at 50-60Hz, 15 Watts		
FUSE RATING	63mA for 230Volt, 120mA for 115Volt		
CONFORMING TO BS EN 60127-2:1991 SHEETIII			
FUSE TYPE	20mm x 5mm, Class 3 Slo-Blo, 250Volt working		
CASE SIZE	482mm (w) x 44mm (h) x 175mm (d)		
WEIGHT (incl packaging)	3.7 Kgs		